

**Amendments To The Specification**

Please replace paragraph [0009] in the specification page 3, with the following amended paragraph:

Data frames entering the device via UNI 20 enter the bridge device 400 via the bridge port corresponding to the UNI, the bridge device 400 calculates the bridge output port according to the address information in the data frames and sends the data frames to the ~~corresponding~~-mapping/demapping device 102, which maps the data frames and then outputs them to the NNI, via the output port, and vice versa.

Please replace paragraph [0012] in the specification page 4, with the following amended paragraph:

Fig. 3 shows a block diagram of a third prior art device utilizing RPR scheme. The device comprises one or more UNIs (standard Ethernet UNIs), two NNIs (synchronous digital transmission channels), and a RPR device 600 (described in IEEE802.17), two mapping/demapping devices, and a data processing device 500 which may be a data ~~converging/deconverging~~ converging/diverging device or a bridge device.

Please replace paragraph [0014] in the specification page 4, with the following

amended paragraph:

Step 1: the data processing device 500 processes the data frames (the data frames are converged if the data processing device is a data ~~converging/deconverging~~ converging/diverging device; the data frames are switched if the data processing device is a bridge device);

Please replace paragraph [0016] in the specification page 4, with the following amended paragraph:

Step 3: the RPR device 600 sends the data frames to the ~~corresponding~~—mapping/demapping device according to the address information in the data frames; and

Please replace paragraph [0017] in the specification page 4, with the following amended paragraph:

Step 4: the mapping/demapping device performs a mapping operation for the data frames and sends them to the outside of the device via the ~~corresponding~~ NNI.

Please replace paragraph [0021] in the specification page 4, with the following amended paragraph:

Step 3: the data processing device 500 processes the data frames (the data frames are ~~deconverged~~ diverged if the data processing device is a data ~~converging/deconvergin~~ converging/diverging device; the data frames are switched if the data processing device is a bridge device); and

Please replace paragraph [0022] in the specification page 5, with the following amended paragraph:

Step 4: the data processing device 500 finds the ~~corresponding~~ UNI according to the address information in the data frames and then outputs the data frames via the UNI.

Please replace paragraph [0025] in the specification page 5, with the following amended paragraph:

According to one aspect of the present invention, it is provided a method of processing data through a system for accessing and transmitting different data frames in a digital transmission network. This system includes at least a UNI, which is used to couple with the user's network; at least an NNI, which is used to couple with ~~said~~ the digital transmission network to

transfer data; at least one mapping/demapping device; a virtual interface device, which couples with at least one UNI and couples with at least one NNI via the mapping/demapping device; a control device, which couples with the virtual interface device to control it to access and transmit the data frames. The method comprises the steps of the virtual interface device classifying the data frames, and the virtual interface device outputting the data frames to the **corresponding** device interfaces.

Please replace paragraph [0028] in the specification page 6, with the following amended paragraph:

Preferably, the step of the virtual private device processing the data frames comprises the following step: relaying and/or converging and/or **deconverging diverging** the data frames.

Please replace paragraph [0057] in the specification page 10, with the following amended paragraph:

Fig. 4 shows a system that accesses and transmits different data frames in a digital transmission network. The system comprises a plurality of UNIs designed to couple with the users' networks, a plurality of NNIs designed to couple with ~~said~~ **the** digital transmission network to transmit data, a plurality of mapping/demapping devices 10, a virtual interface device 80

coupled with ~~said the~~ UNIs and also coupled with ~~said the~~ NNIs via ~~said the~~ mapping/demapping devices 10, a data processing and dispatching device 90 coupled with ~~said the~~ virtual interface device 80, a ~~plurality of~~ virtual private ~~devices device~~ 120 and a ~~plurality of~~ virtual bridge ~~device devices~~ 100 and a RPR device 110 coupled with ~~the said~~ data processing and dispatching device. Although a ~~plurality of~~ virtual private ~~device devices~~ 120, a ~~plurality of~~ virtual bridge ~~device devices~~ 100 and a RPR device 110 are described in the present application, it should be noted that a combination of any one or two of them can implement the present invention. The input to ~~said~~ system comprises: (1) data frames entering the system via the UNIs and (2) data frames entering the system via the NNIs. The data frames output from ~~said~~ system comprises: (1) data frames from the UNIs and (2) data frames from the NNIs.

Please replace paragraph [0063] in the specification page 11, with the following amended paragraph:

In step 5, it is determined whether the data frames are sent to the processing device or the virtual interface device ~~the data processing and dispatching device transfers the data frames to the corresponding processing device.~~ If ~~the corresponding processing device is~~ the data frames are sent to the ~~[[a]]~~ virtual interface device, go to step 8; if the data frames are sent to the processing device, go to step 6.

Please replace paragraph [0064] in the specification page 11, with the following amended paragraph:

In step 6, ~~said~~ **corresponding** the processing device processes the data frames, modifies the data type number at the end of the processing, and then transfers the modified data frames to the data processing and dispatching device;

Please replace paragraph [0066] in the specification page 11, with the following amended paragraph:

In step 8, the virtual interface device finds the ~~corresponding~~ device interface according to the data type number in the data frames;

Please replace paragraph [0066] in the specification pages 11, with the following amended paragraph:

Fig. 4A shows a schematic block diagram of a virtual interface device in a preferred embodiment of the system accessing and transmitting Ethernet data frames in a SDH/SONET network according to the present invention. A virtual interface device 80 is used to enhance access ability. Via the virtual interface device 80, a device interface (UNI 20 or NNI 30) may be expanded to a plurality of virtual interfaces, each of which supports specific users and

services. For data frames entering the system via the device interfaces (UNI 20 and NNI 30), the virtual interface processing unit 800 of the virtual interface device will classify them according to different services required by the users and choose ~~corresponding~~ --a-- processing for them. Different processing corresponds to different rules in the rule database 850. The control interface unit controls the virtual interface processing unit 800 to classify the data frames according to the orders from the control interface and searches for ~~corresponding~~ rules stored in the rule database 850 to process the data. Data frames output from the device are transferred to a ~~corresponding~~ device interface after classified in the virtual interface device. Because the virtual interface device stores N rules, the mapping relationship between the device interface and those rules is 1:N. The rules in the virtual interface device may be set up or deleted dynamically. Therefore, it is easy to modify the rules to enhance the adaptability of the system according to the users' requirements and the updating of the system. The device also comprises a software loader (not shown) to load different software.

Please replace paragraph [0074] in the specification page 12-13, with the following amended paragraph:

As the processing center, the virtual interface processing unit 800 is responsible for processing data frames. The processing steps and processing logic in the virtual interface processing unit are firmware and can't be modified

during operation of the system. The rule database is the control center and is responsible for providing relevant processing and control parameters when the virtual interface processing unit processes the data frames. Different parameters lead to ~~corresponding~~ processing behaviors. During operation of the system, the rules in the rule database may be updated. The control interface unit provides an external control interface. Via the control interface, the control system of the device may monitor the virtual interface processing unit and performs adding, deleting, editing, and querying operations to the rules in the rule database. The rule database may store a plurality of rules, each of which contains five parts: a device interface number, data frame type number, data frame address offset, data frame type value, and data frame comparison mask.

Please replace paragraph [0078] in the specification page 13, with the following amended paragraph:

Step 2: examining the searching result; if it is blank, discarding ~~said~~  
~~the~~ data frames and going to step 10;



Please replace paragraph [0080] in the specification page 13, with the following amended paragraph:

Step 4: performing an "AND" operation between **said the** read information and data frame comparison mask in the rule;

Please replace paragraph [0082] in the specification page 13, with the following amended paragraph:

Step 6: searching for the next rule corresponding to **said the** device interface in the rule database;

Please replace paragraph [0090] in the specification page 14, with the following amended paragraph:

Step 3: determining the searching result; if it is blank, discarding **said the** data frames and going to step 6;

Please replace paragraph [0092] in the specification page 14, with the following amended paragraph:

Step 5: sending the data frames to a **corresponding** device interface according to the device interface number in the rule;

Please place the following paragraph between paragraph [0093] and paragraph [0094] in the specification page 14, with the following amended paragraph:

The system accessing and transmitting Ethernet data frames in an SDH/SONET network comprises a plurality of UNIs designed to couple with the users' networks, a plurality of NNIs designed to couple with the digital transmission network to transmit data, a plurality of mapping/demapping devices 10, a virtual interface device 80 coupled with the UNIs and also coupled with the NNIs via the mapping/demapping devices 10, a data processing and dispatching device 90 coupled with the virtual interface device 80, a virtual private device 120 and a plurality of virtual bridge devices 100 and a RPR device 110 coupled with the data processing and dispatching device. Although a virtual private device 120, a plurality of virtual bridge devices 100 and a RPR device 110 are described in the present invention, it should be noted that a combination of any one or two of them can implement the present invention.

Please replace paragraph [0094] in the specification pages 14-15, with the following amended paragraph:

Fig. 5 shows a schematic block diagram of a virtual private device in a preferred embodiment of the system accessing and transmitting Ethernet data frames in an SDH/SONET network according to the present invention. ~~The system accessing and transmitting Ethernet data frames in an SDH/SONET network comprises a plurality of UNIs designed to couple with the users' networks, a plurality of NNIs designed to couple with said digital transmission network to transmit data, a plurality of mapping/demapping devices 10, a virtual interface device 80 coupled with said UNIs and also coupled with said NNIs via said mapping/demapping devices 10, a data processing and dispatching device 90 coupled with said virtual interface device 80, a plurality of virtual private devices 120 and a virtual bridge device 100 and a RPR device 110 coupled with said data processing and dispatching device. Although a plurality of virtual private devices 120, a virtual bridge device 100 and a RPR device 110 are described in the present invention, it should be noted that a combination of any one or two of them can implement the present invention.~~ In the virtual private device, a virtual private processing unit 8001 is coupled with the inter-device interface to process the data from the inter-device interface. The virtual private processing

unit 8001 is also coupled to the rule database and the control interface unit.

The control interface unit exchanges data with the outside world via the control interface.

Please replace paragraph [0095] in the specification page 15, with the following amended paragraph:

The present invention enhances the converging ability of the system by utilizing the virtual private device. The virtual private device stores converging rules, ~~deconverging~~ diverging rules, and relay rules (the relay rules are optional and unnecessary in some simple virtual private devices). The mapping relationship between the data types and the rules is 1:1. The rules in the virtual private device can be set up and deleted dynamically. Data frames of different users can be isolated, transmitted and shared by adding a label before sending, changing the label during transmission and removing the label at the destination address. A virtual private device comprises a virtual private processing unit and a rule database in it.

Please replace paragraph [0096] in the specification page 15, with the following amended paragraph:

The virtual private processing unit has two major functions:

(a) Detecting control messages and transferring the control messages to the control system of the device via the control interface unit.

(b) Performing a convergence, ~~deconvergence~~ divergence, or relay operation for data frames except for the control messages.

Please replace paragraph [0098] in the specification page 16, with the following amended paragraph:

As the control center, the rule database controls the processing action of the virtual private processing unit. The rules in the rule database may be updated dynamically. The rule database may store a plurality of rules, each of which comprises the following information: an input data frame type number, rule type (~~convergence/deconvergence/relay~~ convergence/divergence/relay), label number, and output data frame type number.

Please replace paragraph [0099] in the specification page 16, with the following amended paragraph:

Wherein ~~said the~~ virtual private device is connected to the data processing and dispatching device via the inter-device interface; ~~said the~~ virtual private device is connected to the control system of the device via the control interface.

Please replace paragraph [0101] in the specification page 16, with the following amended paragraph:

In view of expandability and compatibility, it is recommended to implement the virtual private device with MPLS, GFP, VMAN, or Nested VLAN technique. The device manufacturers may also employ self-defined label formats (or self-defined data frame packets) to implement **said the** virtual private device. The system may support a plurality of virtual private devices implemented with different technical schemes.

Please replace paragraph [0107] in the specification page 17, with the following amended paragraph:

Step 5: determining the searching result; if it is blank, discarding **said the** data frames and going to step 12;

Please replace paragraph [0108] in the specification page 17, with the following amended paragraph:

Step 6: determining the rule type; if it is a convergence rule, going to step 7; if it is a ~~deconvergence~~ **divergence** rule, going to step 8; if it is a relay rule, going to step 9;

Please replace paragraph [0129] in the specification page 20, with the following

amended paragraph:

Step 5: determining the searching result; if it is blank, discarding **said the** data frames and going to step 17;

Please replace paragraph [0138] in the specification page 21, with the following amended paragraph:

Step 14: examining the search result; if it is blank, discarding **said the** data frames and going to step 17;

Please replace paragraph [0143] in the specification page 22, with the following amended paragraph:

Step 1: searching for the first item corresponding to **said the** virtual bridge in the virtual bridge database with the index of the virtual bridge number;

Please replace paragraph [0144] in the specification page 22, with the following amended paragraph:

Step 2: examining the retrieval result; if it is blank, discarding **said the** data frames and going to step 7;

Please replace paragraph [0152] in the specification page 23, with the following amended paragraph:

Step 2: determining the retrieval result; if it is blank, discarding **said the** data frames and going to step 9;

Please replace paragraph [0155] in the specification page 23, with the following amended paragraph:

Step 5: examining the retrieval result; if it is blank, discarding **said the** data frames and going to step 8;

Please place the following paragraph between paragraph [0159] and paragraph [0160] in the specification page 23:

**The system comprises a plurality of UNIs designed to couple with the users' networks, a plurality of NNIs designed to couple with the digital transmission network to transmit data, a plurality of mapping/demapping devices 10, a virtual interface device 80 coupled with the UNIs and also coupled with the NNIs via the mapping/demapping devices 10, a data processing and dispatching device 90 coupled with the virtual interface device 80, a virtual private device 120 and a plurality of virtual bridge devices 100 and a RPR device 110 coupled with the data processing and dispatching device. Although a virtual private device 120, a plurality of virtual bridge devices 100 and a RPR device 110 are described in the**



present invention, it should be noted that a combination of any one or two of them can implement the present invention.

Please replace paragraph [0160] in the specification pages 23-24, with the following amended paragraph:

Fig. 7 shows a schematic block diagram of a data processing and dispatching device in a preferred embodiment of the system for accessing and transmitting Ethernet data frames in an SDH/SONET network according to the present invention. ~~The system comprises a plurality of UNIs designed to couple with the users' networks, a plurality of NNIs designed to couple with said digital transmission network to transmit data, a plurality of mapping/demapping devices 10, a virtual interface device 80 coupled with said UNIs and also coupled with said NNIs via said mapping/demapping devices 10, a data processing and dispatching device 90 coupled with said virtual interface device 80, a plurality of virtual private devices 120 and a virtual bridge device 100 and a RPR device 110 coupled with said data processing and dispatching device. Although a plurality of virtual private devices 120, a virtual bridge device 100 and a RPR device 110 are described in the present invention, it should be noted that a combination of any one or two of them can implement the present invention.~~ The data processing and dispatching device is coupled with a plurality of inter-device interfaces to process ~~said the~~ data from the inter-device interfaces. The data

processing and dispatching device is also coupled with the processing flow database and the control interface unit. The control interface unit exchanges data with the outside world via the control interface.

Please replace paragraph [0161] in the specification page 24, with the following amended paragraph:

The present invention utilizes the data processing and dispatching device to implement individualized services to improve equipment serviceability. The data processing device stores a plurality of processing flows. The mapping relationship between the processing flows and the data frame types is 1:1. The data processing and dispatching device finds the **corresponding** processing flow according to the data frame type, and informs other devices to process the data frames according to the processing flow. The processing flows in the data frame processing device may be set up, edited, or deleted dynamically. During the operation of the system, the operator may quickly provide individualized services to maximize the efficacy of the system through adding, editing, and deleting the processing flows in the data processing device.

Please replace paragraph [0168] in the specification page 25, with the following amended paragraph:

Step 3: examining the searching result; if it is blank, discarding **said the** data frames and going to step 6;

Please replace paragraph [0174] in the specification page 26, with the following amended paragraph:

Processing flow combination 1:

- (1) The virtual interface device classifies the data frames;
- (2) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0175] in the specification pages 26, with the following amended paragraph:

Processing flow combination 2:

- (1) The virtual interface device classifies the data frames;
- (2) The virtual bridge device switches the data frames;
- (3) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0176] in the specification page 26, with the following amended paragraph:

Processing flow combination 3:

- (1) The virtual interface device classifies the data frames;

(2) The virtual private device processes the data frames (relay, converge, or **deconverge diverge**);

(3) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0177] in the specification pages 26-27, with the following amended paragraph:

Processing flow combination 4:

(1) The virtual interface device classifies the data frames;

(2) The RPR device processes the data frames (terminates, relays, or starts data frame transmission);

(3) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0178] in the specification page 27, with the following amended paragraph:

Processing flow combination 5:

(1) The virtual interface device classifies the data frames;

(2) The virtual bridge device switches the data frames;

(3) The virtual private device converges the data frames;

4) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0179] in the specification page 27, with the following amended paragraph:

Processing flow combination 6:

- (1) The virtual interface device classifies the data frames;
- (2) The virtual private device **diverges ~~deconverges~~** the data frames;
- (3) The virtual bridge device switches the data frames;
- (4) The virtual interface device outputs the data frames to **correspondig** device interfaces.

Please replace paragraph [0180] in the specification page 27, with the following amended paragraph:

Processing flow combination 7:

- (1) The virtual interface device classifies the data frames;
- (2) The virtual private device **diverges ~~deconverges~~** the data frames;
- (3) The virtual bridge device switches the data frames;
- (4) The virtual private device converges the data frames;

(5) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0181] in the specification page 28, with the following amended paragraph:

Processing flow combination 8:

- (1) The virtual interface device classifies the data frames;
- (2) The RPR device terminates sending the data frames;
- (3) The virtual bridge device switches the data frames;
- (4) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0182] in the specification pages 28, with the following amended paragraph:

Processing flow combination 9:

- (1) The virtual interface device classifies the data frames;
- (2) The virtual bridge device switches the data frames;
- (3) The RPR device begins to send the data frames;
- (4) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0183] in the specification page 28, with the following amended paragraph:

Processing flow combination 10:

- (1) The virtual interface device classifies the data frames;
- (2) The RPR device terminates sending the data frames;
- (3) The virtual bridge device switches the data frames;
- (4) The RPR device begins to send the data frames;
- (5) The virtual interface device outputs the data frames to

**corresponding** device interfaces.

Please replace paragraph [0184] in the specification pages 28-29, with the following amended paragraph:

Processing flow combination 11:

- (1) The virtual interface device classifies the data frames;
- (2) The virtual private device converges the data frames;
- (3) The RPR device begins to send the data frames;
- (4) The virtual interface device outputs the data frames to

**corresponding** device interfaces.

Please replace paragraph [0185] in the specification pages 29, with the following amended paragraph:

Processing flow combination 12:

- (1) The virtual interface device classifies the data frames;
- (2) The RPR device terminates sending the data frames;
- (3) The virtual private device diverges ~~deconverges~~ the data frames;
- (4) The virtual interface device outputs the data frames to ~~corresponding~~ device interfaces.

Please replace paragraph [0186] in the specification page 29, with the following amended paragraph:

Processing flow combination 13:

- (1) The virtual interface device classifies the data frames;
- (2) The RPR device terminates sending the data frames;
- (3) The virtual private device relays the data frames;
- (4) The RPR device begins to send the data frames;
- (5) The virtual interface device outputs the data frames to ~~corresponding~~ device interfaces.



Please replace paragraph [0187] in the specification pages 29-30, with the following amended paragraph:

Processing flow combination 14:

- (1) The virtual interface device classifies the data frames;
- (2) The RPR device terminates sending the data frames;
- (3) The virtual private device diverges ~~deconverges~~ the data frames;
- (4) The virtual bridge device switches the data frames;
- (5) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0188] in the specification page 30, with the following amended paragraph:

Processing flow combination 15:

- (1) The virtual interface device classifies the data frames;
- (2) The virtual bridge device switches the data frames;
- (3) The virtual private device converges the data frames;
- (4) The RPR device begins to send the data frames;
- (5) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0189] in the specification page 30, with the following amended paragraph:

Processing flow combination 16:

- (1) The virtual interface device classifies the data frames;
- (2) The RPR device terminates sending the data frames;
- (3) The virtual private device **diverges ~~deconverges~~** the data frames;
- (4) The virtual bridge device switches the data frames;
- (5) The virtual private device converges the data frames;
- (6) The RPR device begins to send the data frames;
- (7) The virtual interface device outputs the data frames

**corresponding** to device interfaces.

Please replace paragraph [0190] in the specification pages 30-31, with the following amended paragraph:

Processing flow combination 17:

- (1) The virtual interface device classifies the data frames;
- (2) The virtual private device **diverges ~~deconverges~~** the data frames;
- (3) The RPR device terminates sending the data frames;

4) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0191] in the specification page 31, with the following amended paragraph:

Processing flow combination 18:

- (1) The virtual interface device classifies the data frames;
- (2) The RPR device begins to send the data frames;
- (3) The virtual private device converges the data frames;
- (4) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0192] in the specification page 31, with the following amended paragraph:

Processing flow combination 19:

- (1) The virtual interface device classifies the data frames;
- (2) The virtual private device **diverges deconverges** the data frames;
- (3) The RPR device relays the data frames;
- (4) The virtual private device converges the data frames;
- (5) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0193] in the specification pages 31-32, with the following amended paragraph:

Processing flow combination 20:

- (1) The virtual interface device classifies the data frames;
- (2) The virtual private device **diverges ~~deconverges~~** the data frames;
- (3) The RPR device terminates sending the data frames;
- 4) The virtual bridge device switches the data frames;
- 5) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0194] in the specification pages 32, with the following amended paragraph:

Processing flow combination 21:

- (1) The virtual interface device classifies the data frames;
- (2) The virtual bridge device switches the data frames;
- (3) The RPR device begins to send the data frames;
- (4) The virtual private device converges the data frames;
- 5) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0195] in the specification page 32, with the following amended paragraph:

Processing flow combination 22:

- (1) The virtual interface device classifies the data frames;
- (2) The virtual private device diverges ~~deconverges~~ the data frames;
- (3) The RPR device terminates sending the data frames;
- (4) The virtual bridge device switches the data frames;
- (5) The RPR device begins to send the data frames;
- (6) The virtual private device converges the data frames;
- (7) The virtual interface device outputs the data frames to **corresponding** device interfaces.

Please replace paragraph [0197] in the specification page 33, with the following amended paragraph:

**Said The** device supports the following processing flow combinations:

- (1) Processing flow combination 1;
- (2) Processing flow combination 3.